NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
UNINCORPORATED AREAS OF GRAYSON COUNTY, VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the unincorporated areas of Grayson County, Virginia, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the U. S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-1823. This work was completed in September 1987.

1.3 Coordination

On January 22, 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives from FEMA, the county, and the USGS (the study contractor) to determine the streams to be studied by detailed methods.

On July 20, 1988, a final CCO meeting was held with representatives from FEMA, the county, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Grayson County, Virginia. The Towns of Troutdale, Independence, and Fries are located within Grayson County but are not included in this study. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: the New River, from a point approximately 1.2 miles upstream of the confluence of Stevens Creek to a point approximately 43 miles upstream; Wilson Creek, from its confluence with the New River to a point approximately 9.6 miles upstream; Elk Creek, from the confluence of Shop Branch to a point approximately 1.9 miles upstream; and Chestnut Creek, from the downstream county boundary to a point approximately 1.8 miles upstream. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through September 1992.

The following flooding sources were studied by approximate methods: Fox Creek; Powdermill Creek; Stevens Creek; Brush Creek; Knob Fork; Middle Fork Helton Creek; Helton Creek; Middle Fox Creek; Peggies Branch; Peach Bottom Creek; Saddle Creek; the Little River; Meadow Creek; Coal Creek; Glady Fork; Jerry Creek; Turkey Fork; Mud Creek; Jumping Creek; and the remaining portions of the New River, Elk Creek, Wilson Creek, and Chestnut Creek. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Grayson County.

2.2 Community Description

Grayson County is located in southwest Virginia. Grayson County is bordered by the unincorporated areas of Wythe and Smyth Counties to the north; the unincorporated areas of Carroll County to the east; the unincorporated areas of Alleghany County, and Surry and Ashe Counties, North Carolina, to the south; and the unincorporated areas of Washington County and Johnson County, Tennessee, to the west.

2.3 Principal Flood Problems

Major streams in Grayson County include the New River, Wilson Creek, Elk Creek, and Chestnut Creek. Flooding along these streams occurs as the result of overbank flow from heavy rains associated with low pressure systems or heavy thunderstorms.

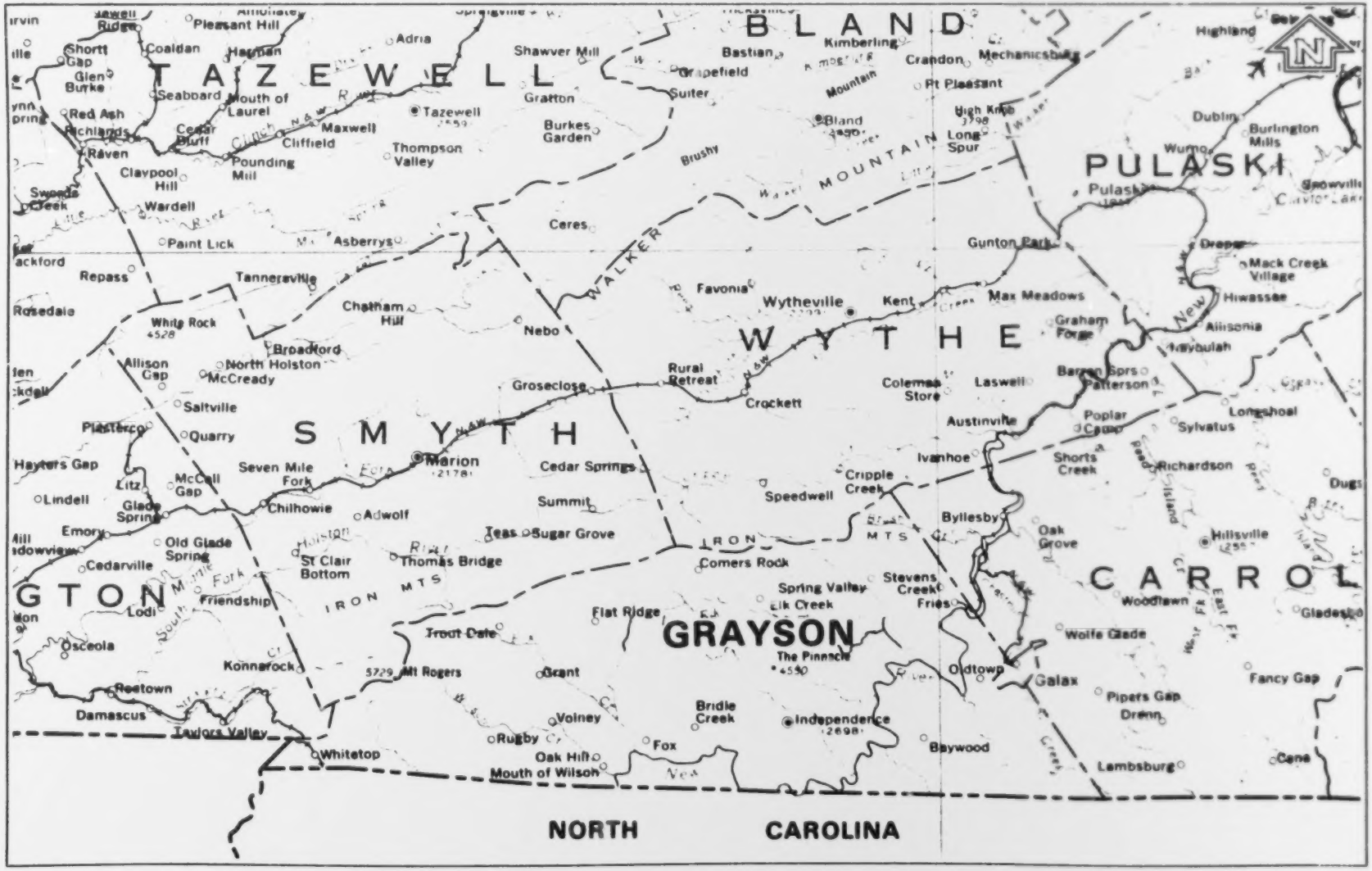


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA

(UNINCORPORATED AREAS)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

The largest flood recorded since 1930 at USGS gaging station No. 03164000 on the New River near Galax occurred August 14, 1940. The maximum elevation of this flood was 2,233.7 feet with a peak discharge of 141,000 cubic feet per second (cfs). This flood had a recurrence interval greater than 200-years or a 1 in 200 chance, on the average, of occurring in any given year. A more recent flood in the Galax area occurred October 17, 1975. The October 1975 flood reached a maximum elevation of 2,357.1 feet with a peak discharge of 6,880 cfs at USGS gaging station No. 03165000 on Chestnut Creek at Galax. This flood had a recurrence interval of approximately 50 years. These and other floods in Grayson County have caused widespread damage to public and private property.

The largest potential for flood damage in Grayson County is in floodplains along major streams including the New River, Wilson Creek, Elk Creek, and Chestnut Creek where inundation of populated areas is likely to occur. These streams where future development is likely to occur have been included in this study.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equaled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for floodplain management and for flood insurance rates. This event, commonly termed the 100-year flood, has a 1 percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

Flow records at gaging stations on streams in the community and equations developed by Miller are combined using a weighting method developed by Carpenter for estimating peak flows for the 100-year flood (References 1 and 2). Weighted estimates of the 100-year

flood discharge for each stream studied by detailed methods were calculated.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs) 100-YEAR
NEW RIVER		
Above Fries	1,141*	94,100
Near Galax gage (No. 03164000)	1,131	92,900
Above Elk Creek	1,028*	87,300
Below Johns Creek	1,009*	86,400
Above Little River	861*	77,100
Near State Routes 1401 and 1407	826	74,900
Near Bethany Church	809*	73,900
Near Penitentiary Hill	768*	71,000
Below Bridle Creek	762*	71,000
Below Fox Creek	745*	69,900
Near Mouth of Wilson	628*	63,300
WILSON CREEK		
Near Mouth of Wilson	36.1	10,600
Above Mill Creek	10.3	5,200
ELK CREEK		
Above Shop Branch	39.4	9,130
Near State Route 663	26.0	7,160
CHESTNUT CREEK		
At Galax gage (No. 03165000)	39.0	8,610
Near State Route 89	37.8	8,280
Near Cox Mill	32.1	7,620

*Approximate

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Backwater analysis was determined from cross sections surveyed in the field by transit stadia survey methods. These sections were extended in some cases by measurements taken from topographic maps

at a scale of 1:24,000 with a contour interval of 20 feet (Reference 3). Sections were surveyed at intervals of approximately 3 or 4 per mile except in the case of bridges where sections were surveyed as required for bridge computations.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals were computed using the USGS WSPRO step-backwater computer program (Reference 4, 5, and 6). The program computes the water-surface elevation by step-backwater computations given either the starting elevation, determined from the stage-discharge relationship at a gaging station, or slope-conveyance, determined from the channel slope. Water-surface elevations used to define the 100-year flood elevation at each section are the actual water-surface elevations computed by the program or in the case of supercritical flow, the water-surface elevation used was that of critical flow. Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") used in the hydraulic computations were selected, in the field, at the time the cross sections were surveyed. Sections were subdivided as needed to account for large changes in channel geometry or roughness (Reference 7). Roughness values selected ranged from 0.025 to 0.250.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as

the base flood for floodplain management purposes. For the streams studied in detail, the 100-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 3).

For the flooding sources studied by approximate methods, the 100-year floodplain boundaries were delineated using the Flood Hazard Boundary Map for the unincorporated areas of Grayson County (Reference 8).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

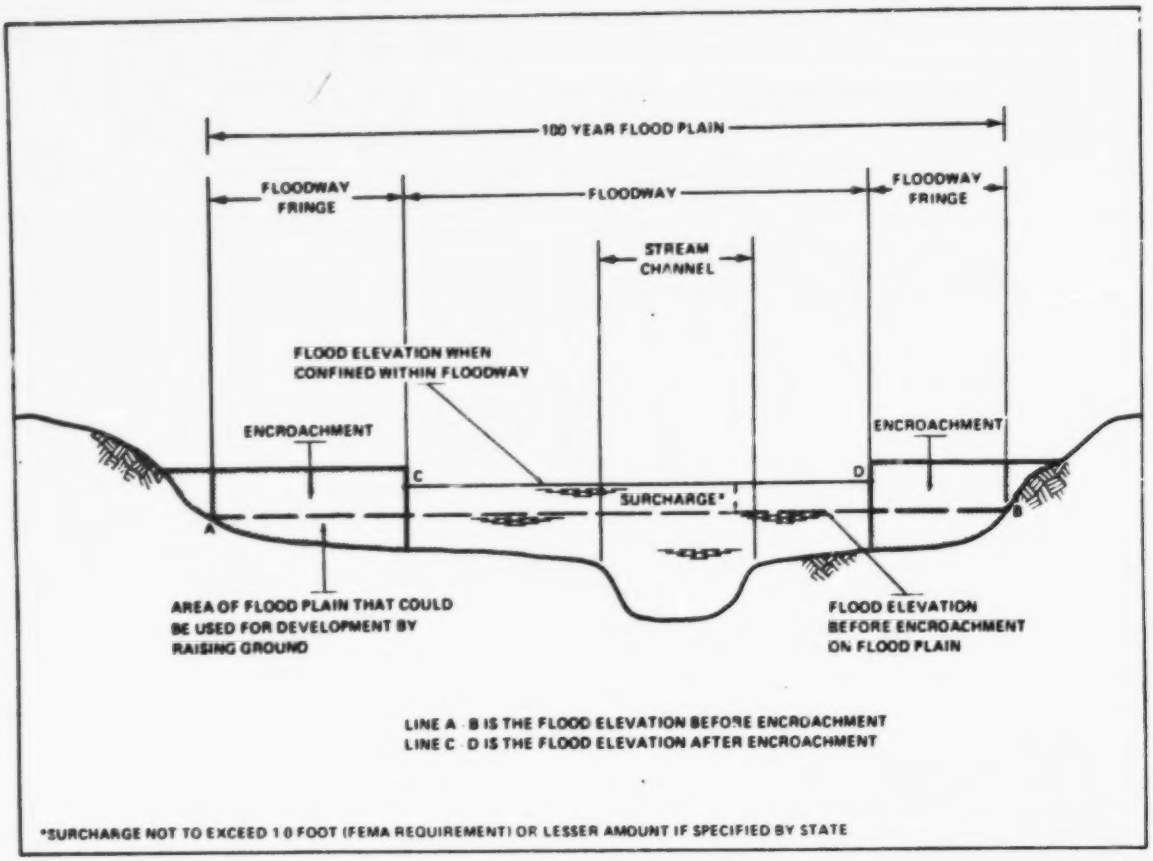
Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 2

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain,and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies for the unincorporated areas of Carroll County, and the Towns of Independence and Fries have been published (References 9, 10, and 11). The results of this study are in agreement with the results of those studies.

Due to its more detailed nature, this study supersedes the Flood Hazard Boundary Map for the unincorporated areas of Grayson County (Reference 8).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of the Interior, Geological Survey, Water Resources Investigations Report 78-5, Technique for Estimating Magnitude and Frequency of Floods in Virginia by E. M. Miller, Washington, D. C., 1978.

2. U. S. Department of the Interior, Geological Survey, and Maryland Department of Natural Resources Report of Investigations No. 35, Characteristics of Streamflow in Maryland by D. H. Carpenter, Washington, D. C., 1983.

3. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: Cumberland Knob, North Carolina-Virginia, 1977; Galot, Virginia, 1984; Brierpatch Mountain, Virginia, 1967; Sparta East, North Carolina-Virginia, 1977; Sparta West, North Carolina-Virginia, 1966; Elk Creek, Virginia, 1967; Mouth of Wilson, North Carolina-Virginia, 1966; Middle Fox Creek, Virginia, 1959; Whitetop Mountain, Virginia, 1978; Trout Dale, Virginia, 1978; Grassy Creek, North Carolina-Virginia, 1978.

4. National Technical Information Service, Bridge Waterways Analysis Model/User's Instructions by J. O. Shearman, W. H. Kirby, and V. R. Schneider, Springfield, Virginia, 1985.

5. U. S. Federal Highway Administration, WSPRO User's Manual by J. O. Shearman and others, Washington, D. C., (Unpublished).

6. U. S. Federal Highway Administration, Report FHWA/RD-86/108, Bridge Waterways Analysis Model/Research Report by J. O. Shearman, W. H. Kirby, V. R. Schneider, and H. N. Flippo, Jr., Washington, D. C., 1986.

7. U. S. Federal Highway Administration, Report No. FHWA-TS-84-202, Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains, Washington, D. C., 1984.

8. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Unincorporated Areas of Grayson County, Virginia, August 21, 1981.

9. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Carroll County, Virginia, Washington, D. C., February 18, 1983

10. Federal Emergency Management Agency, Flood Insurance Study, Town of Independence, Grayson County, Virginia, Washington, D. C., February 1, 1985

11. Federal Emergency Management Agency, Flood Insurance Study, Town of Fries, Grayson County, Virginia, Washington, D. C., February 11, 1983.

U. S. Department of the Interior, Geological Survey, Water Resources Investigations 77-83, A Technique for Determining Depths for T-Year Discharges in Rigid-Boundary Channels by D. E. Burkham, Washington, D. C., 1977.

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	43	2,547.575	Approximately 0.7 mile southwest from Elk Creek along State Route 665 at bridge over Elk Creek. Chiseled square on top of left upstream headwall at left end of bridge.
RM 2	43	2,536.92	Approximately 0.5 mile southeast from Elk Creek along U. S. Route 21 at bridge over Elk Creek. Chiseled square on top right downstream wing wall of bridge.
RM 3	43	2,540.334	Approximately 0.3 mile south of post office along U. S. Route 21, 0.6 mile east along State Route 660, 22 feet southeast of centerline of road at stream crossing. Standard tablet stamped 72 HBC 1967 2540 in southeast concrete wing wall.
RM 4	70	2,204.945	Approximately 2.3 miles northwest of intersection of State Routes 641 and 634 along State Route 641. Chiseled square on 30-inch concrete culvert at stream where State Route 641 turns away from the New River.
RM 5	70	2,224.712	Approximately 0.4 mile northwest of intersection of State Routes 641 and 642. Monument is located on east side of State Roue 641, 6 inches from APCO power pole No. 949523. Standard copperweld monument stamped A.P. CO. VC-2, 1962.
RM 6	105	2,930.61	Approximately 1.2 miles north of Rugby along State Route 743 near intersection of State Route 743 and U. S. Route 58, at bridge on State Route 743 over Wilson Creek at Rugby Volunteer Rescue Squad building. Chiseled square on top of right downstream wing wall.
RM 7	105	2,843.31	Approximately 3.0 miles west of Volney along U. S. Route 58, 175 feet downstream from a footbridge over Wilson Creek and 30 feet north of centerline of road. Point on rock outcrop painted orange directly across from old barn.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 8	105	2,760.17	Approximately 1.6 miles west of Volney along U. S. Route 58, 300 feet downstream from tan trailer and 12 feet north of centerline of road. Point on rock outcrop painted orange.
RM 9	105	2,665.965	Approximately 0.4 mile west of intersection of U. S. Route 58 and State Route 16 in Volney along U. S. Route 58 at bridge over Wilson Creek. Chiseled square on top of right upstream wing wall of bridge.
RM 10	135	2,241.865	Approximately 2.3 miles west from Riverside along U. S. Route 58, 0.3 mile southeast along private drive. Nail in outside side of 36-inch diameter tree stump on left bank.
RM 11	135	2,259.095	Approximately 2.0 miles west from Baywood along State Route 624 across the New River, 1.4 miles northwest along State Route 624, 0.3 mile northwest along the New River. Nail in inside face at base of 12-inch walnut tree along left bank 20 feet from left edge of water.
RM 12	155	2,259.166	Approximately 1.8 miles west from Riverside along U. S. Route 58. Monument is located in southwest corner of intersection of field road and U. S. Route 58, 16 feet south of centerline of U. S. Route 58, 75 feet west of intersection of centerline of highway and field road, 12 feet north of 10-inch gum and 38.3 feet west of nail and washer in top of corner fence post. Standard copperweld monument stamped APCO 1962 VA-5.
RM 13	155	2,252.110	Approximately 0.6 mile west from Riverside along U. S. Route 58 at Elk Creek bridge. Chiseled square on southwest railing post marked with highway plaque.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 14	155	2,248.78	Approximately 7.1 miles southwest of Galax along U. S. Route 58, and 150 feet east of junction of U. S. Route 58 and State Route 94 on bridge over Boags Branch. Chiseled square on west end of north coping of concrete bridge.
RM 15	155	2,282.330	Approximately 0.6 mile east from Riverside along U. S. Route 58. Nail in fence post at outside side of U. S. Route 58 on left bank. Post has no trespassing sign attached.
RM 16	155	2,265.319	Approximately 6.4 miles southwest of Galax along U. S. Route 58, and 40 feet east of intersection U. S. Route 58 and State Route 640. Standard tablet stamped 23 N 1930 in concrete post.
RM 17	155	2,240.41	Approximately 5.6 miles southwest of Galax along U. S. Route 58, and 50 feet east of intersection of U. S. Route 58 and State Route 638. Chiseled square on downstream outside corner of concrete culvert.
RM 18	155	2,239.55	Approximately 4.0 miles southwest of Galax along U. S. Route 58. Chiseled square on west end of third pier from south end of U. S. Route 58 bridge over the New River.
RM 19	155	2,227.995	Approximately 4.0 miles southwest of Galax along U. S. Route 58, 1.2 miles north along road parallel to the New River. Nail in power pole at end of road.
RM 20	155	2,209.255	Approximately 7.5 miles northwest of Galax along State Route 640 at end of road. Chiseled square on downstream outside corner of concrete footing of abandoned building on right bank.
RM 21	158	2,380.795	Approximately 1.4 miles south from Galax along State Route 89 to intersection with State Route 97. Chiseled square on upstream end of concrete median strip.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 22	158	2,379.108	Approximately 1.4 miles south from Galax along State Route 89, 0.9 mile east along State Route 97 to intersection State Route 608. Approximately 100 feet northwest of intersection along Chestnut Creek, 15 feet west of drain. Standard tablet stamped N 8 1930 in rock ledge.
RM 23	158	2,384.16	Approximately 1.4 miles south from Galax along State Route 89, 0.9 mile east along State Route 97, 0.8 mile southeast along State Route 608 to private bridge. Chiseled square on top of left downstream wing wall approximately 3 feet from end of wing wall.
RM 24	120	2,578.523	Approximately 0.8 mile southeast of Volney post office; 3.2 miles northwest of Mouth of Wilson; along U. S. Route 58 and State Route 16, 22 feet south and 70 feet west of center of new concrete bridge over Wilson Creek; standard tablet stamped TT 6 H 1934 on rock outcrop.
RM 25	120	2,523.01	Approximately 2.3 miles southeast of Volney and 1.9 miles northwest of intersection of U. S. Route 58 and State Route 16 in Mouth of Wilson along U. S. Route 58 on 12-inch reinforced concrete culvert between U. S. Route 58 and creek. Chiseled square on northeast corner of headwall.
RM 26	120	2,517.23	Approximately 1.7 miles northwest of intersection of U. S. Route 58 and State Route 16 in Mouth of Wilson along U. S. Route 58, 0.1 mile south along State Route 721 to bridge over Wilson Creek. Chiseled square on top of southeast end of concrete bridge abutment.
RM 27	120	2,482.885	Approximately 0.7 mile west of Mouth of Wilson along State Route 16 at steel girder deck bridge over Wilson Creek. Chiseled square on top of southeast abutment.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

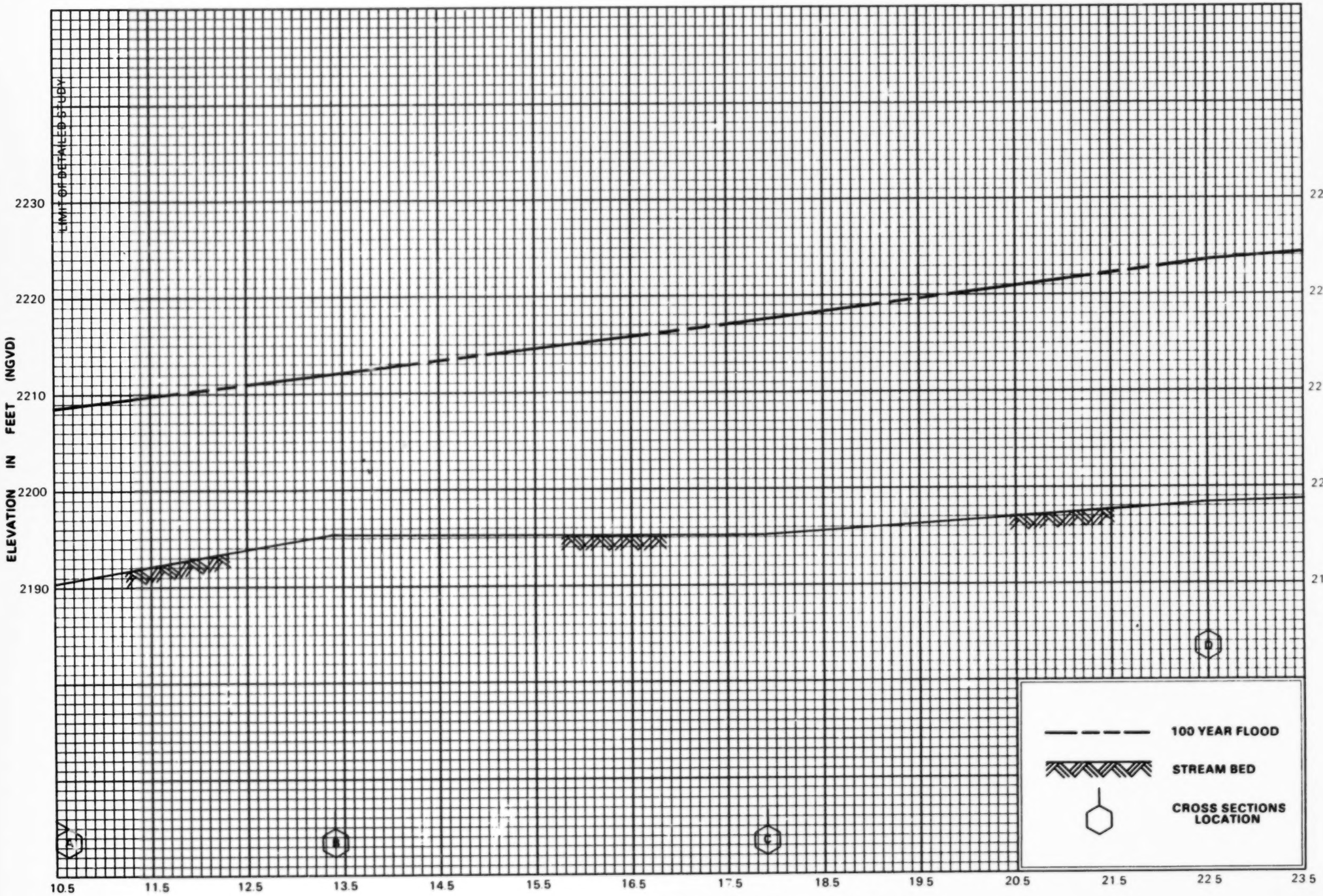
Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 28	120	2,472.370	Approximately 0.2 mile southeast of Mouth of Wilson along U. S. Route 58; in field of A. E. Parsons, 32 feet north of centerline of highway, 2 feet inside fence; standard tablet stamped TT 5 H 1934 in concrete post. Listed as not found since 1951. Marker was located under 6 feet of dirt but appeared undisturbed.
RM 29	120	2,463.64	Approximately 1.3 miles east of Mouth of Wilson along U. S. Route 58, 0.1 mile southeast along State Route 93 to bridge over the New River. Chiseled square on top of left end of upstream concrete guardrail.
RM 30	120	2,456.78	Approximately 2.5 miles northeast of Mouth of Wilson along U. S. Route 58 at bridge over Peggies Branch. Cinch anchor in northeast abutment of bridge established by APCO as marker H 3.
RM 31	140	2,428.79	Approximately 2.4 miles west from Independence along U. S. Route 58, 2.9 miles southwest along State Route 711. Chiseled square in 14-inch concrete culvert at outside edge of State Route 711 directly across from River Ridge Estates sign and utility shed.
RM 32	140	2,403.63	Approximately 2.4 miles west from Independence along U. S. Route 58, then 2.2 miles southwest along State Route 711 at bridge over Saddle Creek. Chiseled square on top of right downstream bridge abutment.
RM 33	140	2,394.655	Approximately 2.4 miles west of Independence along U. S. Route 58, 1.2 miles south along State Route 711 at 90 degree turn in road near mouth of Shoal Creek. APCO cinch-anchor in rock on left bank approximately 100 feet downstream from extension of State Route 711 over the New River.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 34	140	2,376.61	Approximately 2.4 miles west from Independence along U. S. Route 58, 3.6 miles west along State Route 711, 1.3 miles southwest along State Route 601, 1.4 miles east along State Route 708, 0.5 miles north along dirt road. Railroad spike in APCO pole No. 1039-102.
RM 35	140	2,372.175	Approximately 2.4 miles west from Independence along U. S. Route 58, 3.6 miles west along State Route 711, 1.3 miles southwest along State Route 601, 1.4 miles east along State Route 708, 0.3 mile southeast along State Route 708 to private drive. Nail in base of 10-inch Locust tree 20 feet from intersection of road and drive on right bank of the New River.
RM 36	140	2,362.22	Approximately 2.4 miles west from Independence along U. S. Route 58, 3.6 miles west along State Route 711, 1.3 miles southwest along State Route 601, 1.4 miles east along State Route 708, 0.8 mile southeast along State Route 708 to intersection of South Road and State Route 708 at switchback, 0.2 mile south to Virginia-North Carolina State Line, 0.2 mile east to the New River. Nail in upstream side of 12-inch cycanne tree on right bank approximately 200 feet above rapids.
RM 37	145	2,294.081	Approximately 2.0 miles west from Baywood along State Route 624, 1.3 miles southwest on State Route 715, opposite mouth of the Little River. Monument is situated at base of 15-inch walnut tree beside milking barn. Monument is 34.5 feet east of back corner of barn and 32.5 feet east of front corner of barn. Standard copper Weld monument stamped A.P. CO. VA-13, 1962.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 38	145	2,295.685	Approximately 2.0 miles west from Baywood along State Route 624, 2.8 miles southwest on State Route 715, 0.2 mile south on private drive. Chiseled square on landing at bottom of steps leading to front porch of abandoned house on left bank.
RM 39	145	2,361.09	Approximately 3.7 miles south of Independence along U. S. Route 21, 3.2 miles southeast along State Route 700. Nail in base of double-trunked cherry tree on left bank approximately 15 feet toward river from inside edge of gravel road.
RM 40	145	2,320.70	Approximately 3.7 miles south from Independence along U. S. Route 21, 2.0 miles southeast along State Route 700. Chiseled square on large rock that protrudes into the New River, 1.3 feet directly inside of forked walnut tree at outside edge of rock.
RM 41	145	2,337.055	Approximately 3.7 miles south from Independence along U. S. Route 21, 1.1 miles southeast along State Route 700 to small bridge over unnamed creek. Bolt in downstream wheelguard near left end of bridge.
RM 42	145	2,358.289	Approximately 3.7 miles south from Independence along U. S. Route 21 to bridge over the New River. Approximately 90 feet south of filling station of J. T. Carpenter, 40 feet northeast of centerline of north end of bridge, standard tablet stamped 42 N 1930 in concrete port.
RM 43	165	2,291.033	Approximately 2.0 miles west from Baywood along State Route 624, 500 feet north of Boyer Ferry, 30 feet south of residence of Mary Boyer, 5 feet east of gage entrance. Standard tablet stamped 45 N 1930 in concrete post.



FLOOD PROFILES

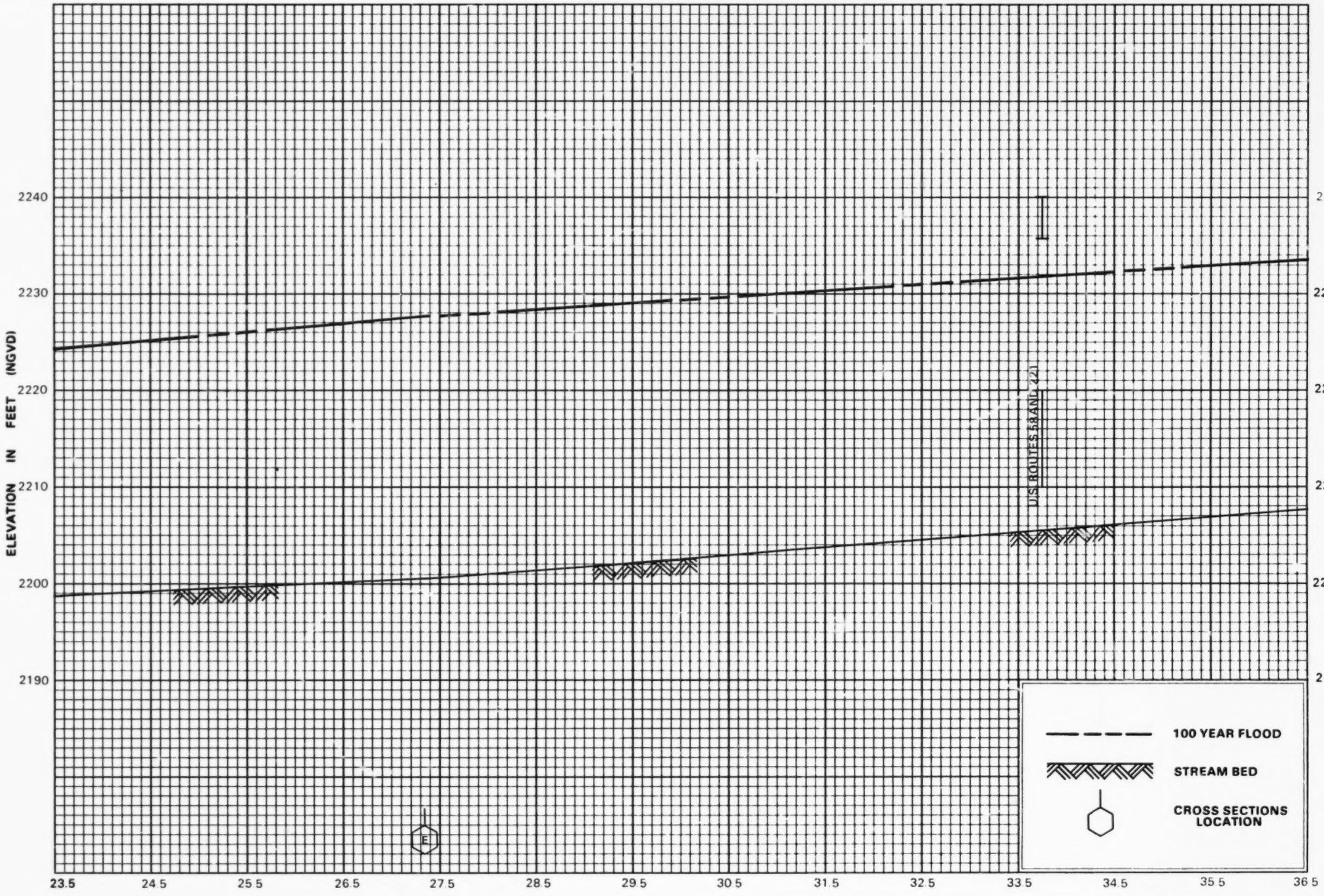
NEW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA

(UNINCORPORATED AREAS)

01P



FLOOD PROFILES

NEW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA

(UNINCORPORATED AREAS)

02P

FLOOD PROFILES

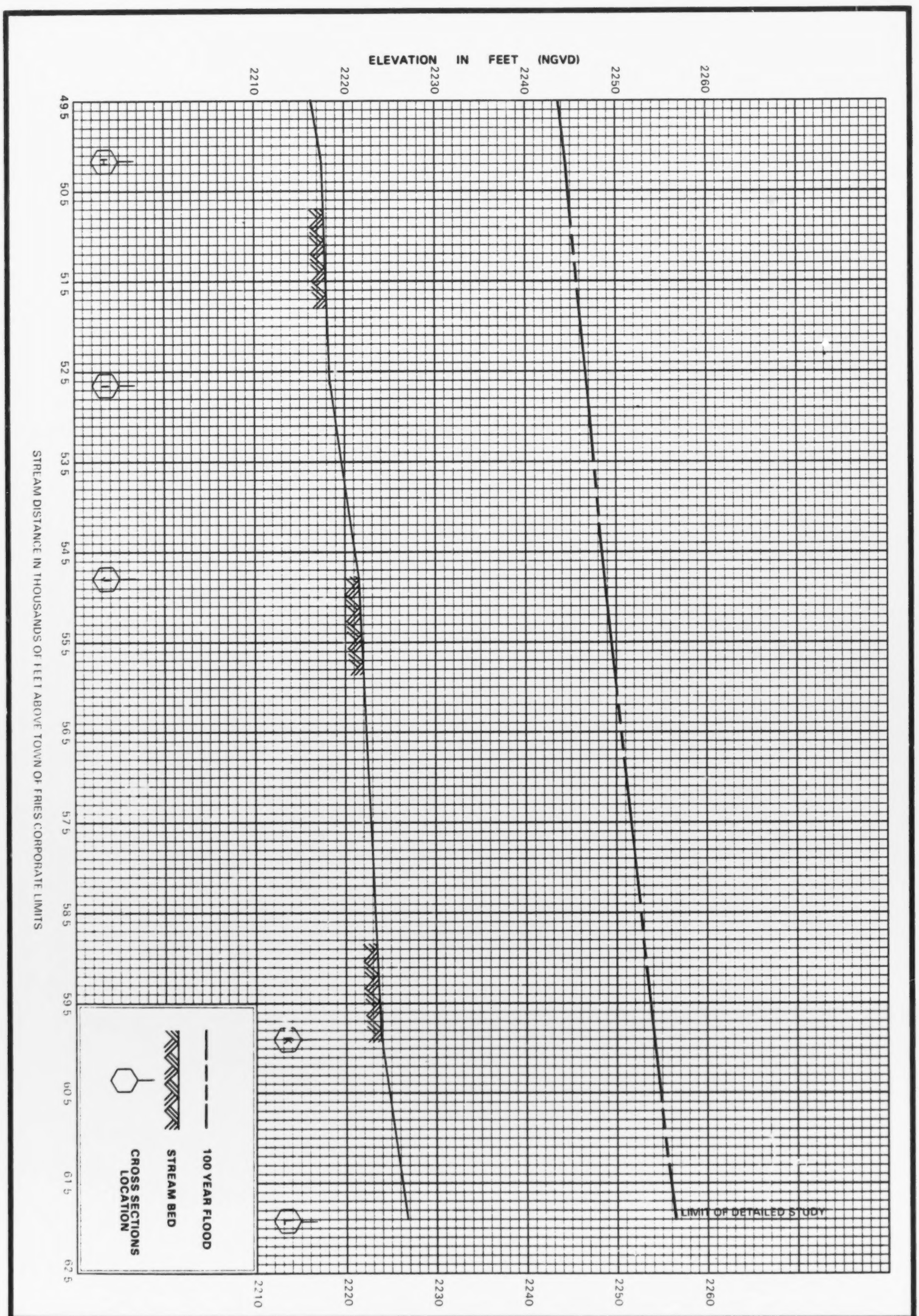
NEW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA

(UNINCORPORATED AREAS)

03P



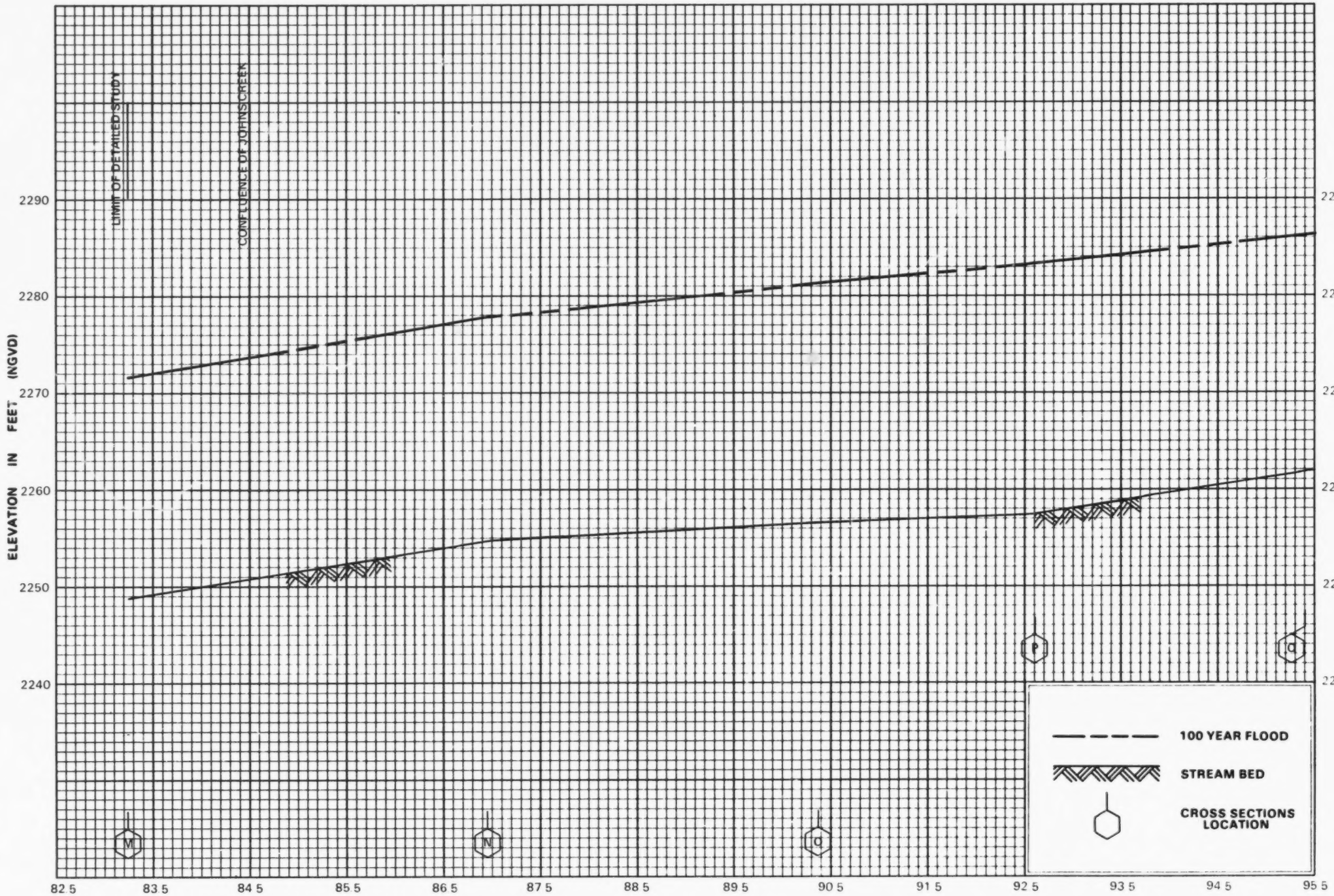
FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

NEW RIVER

04P



FLOOD PROFILES

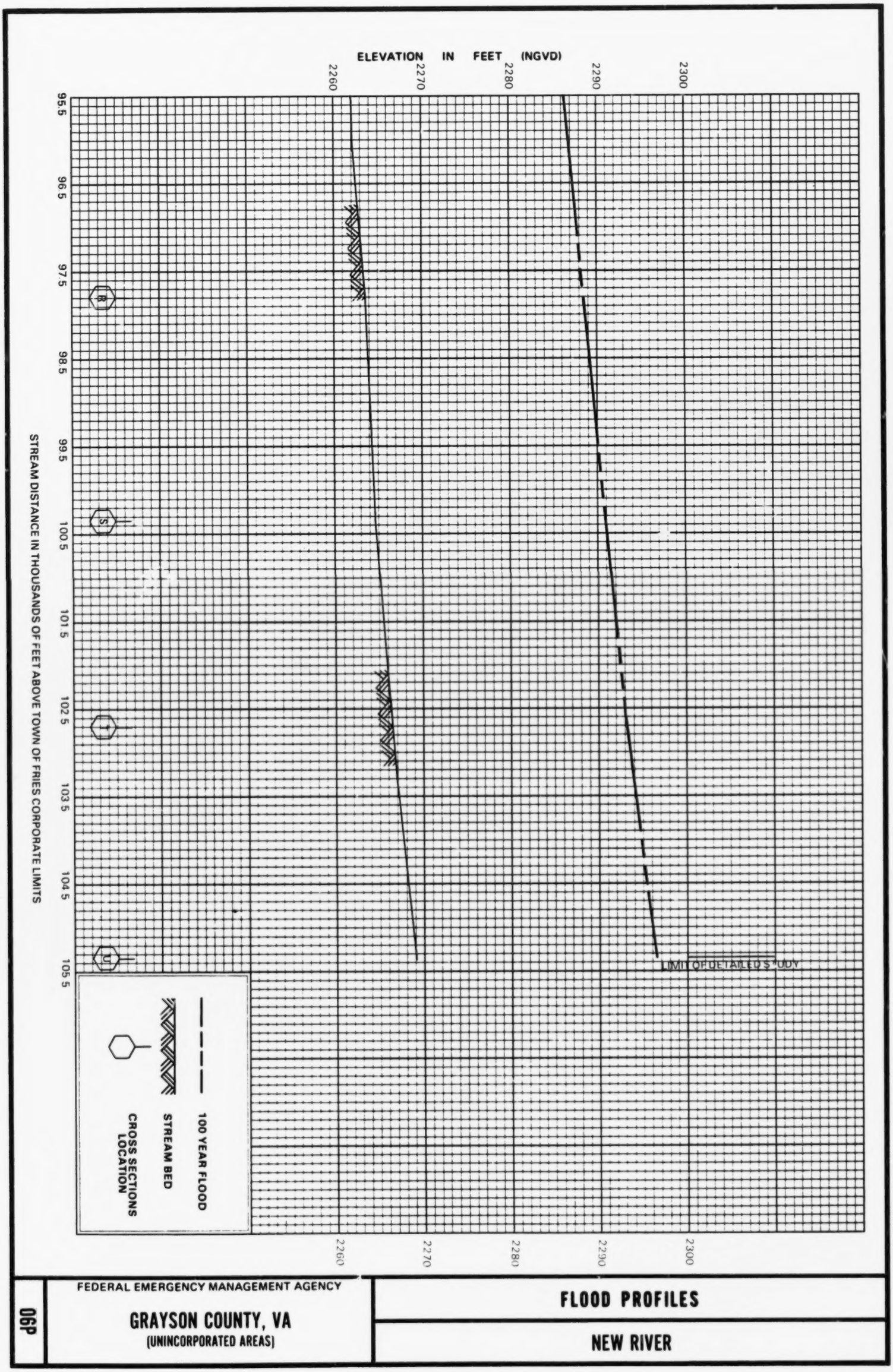
NEW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA

(UNINCORPORATED AREAS)

05P



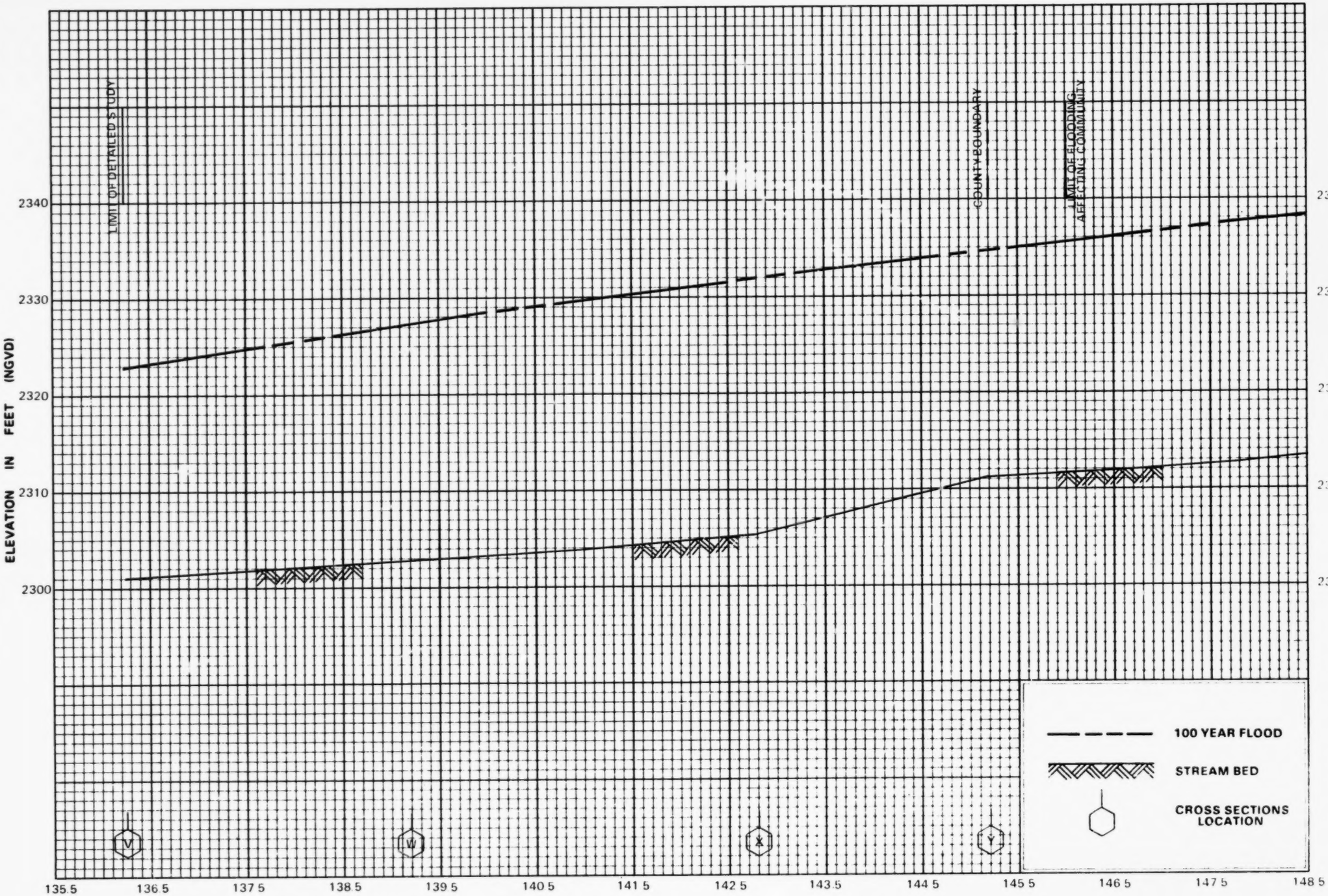
FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

NEW RIVER

06P



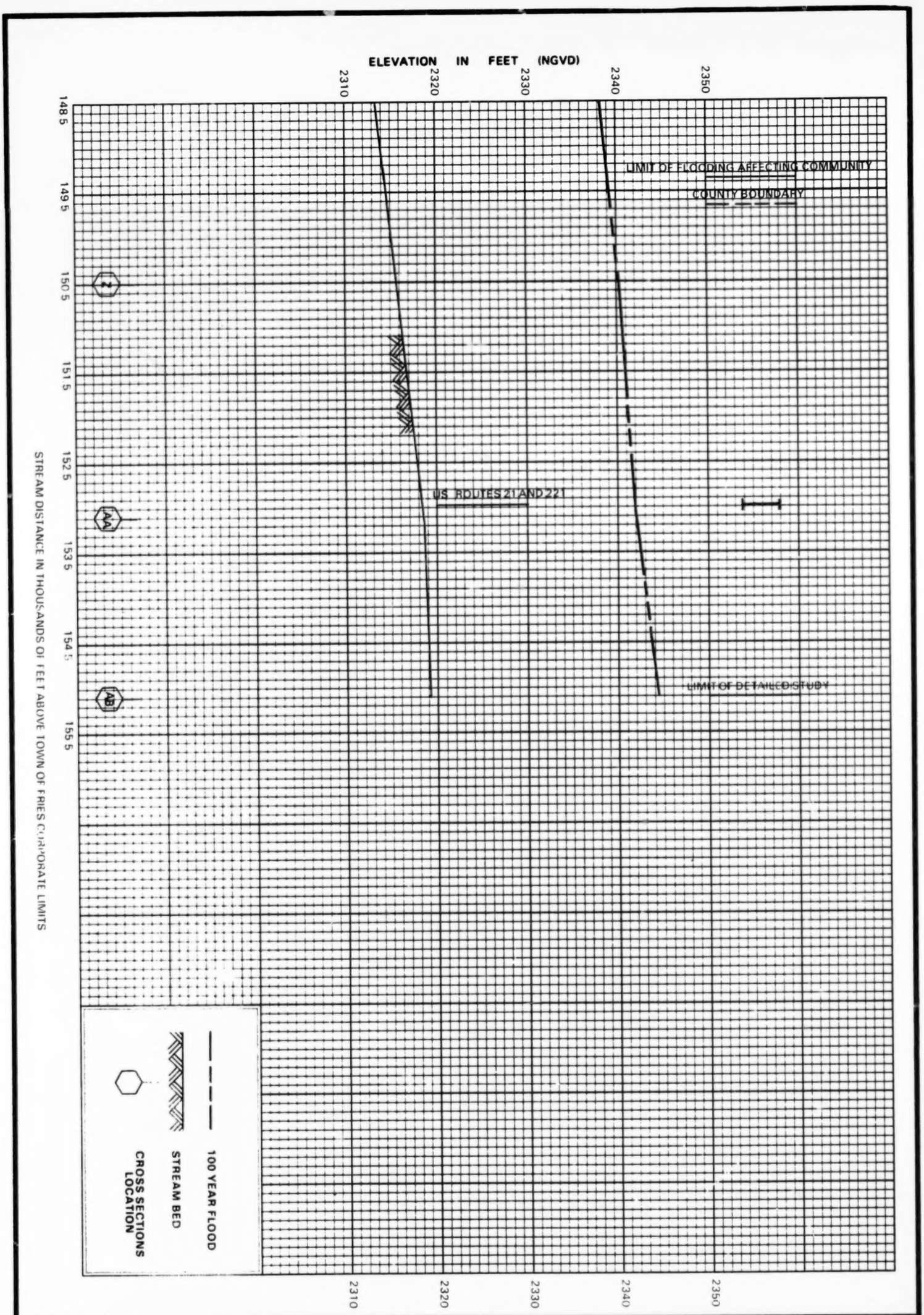
FLOOD PROFILES

NEW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

07P



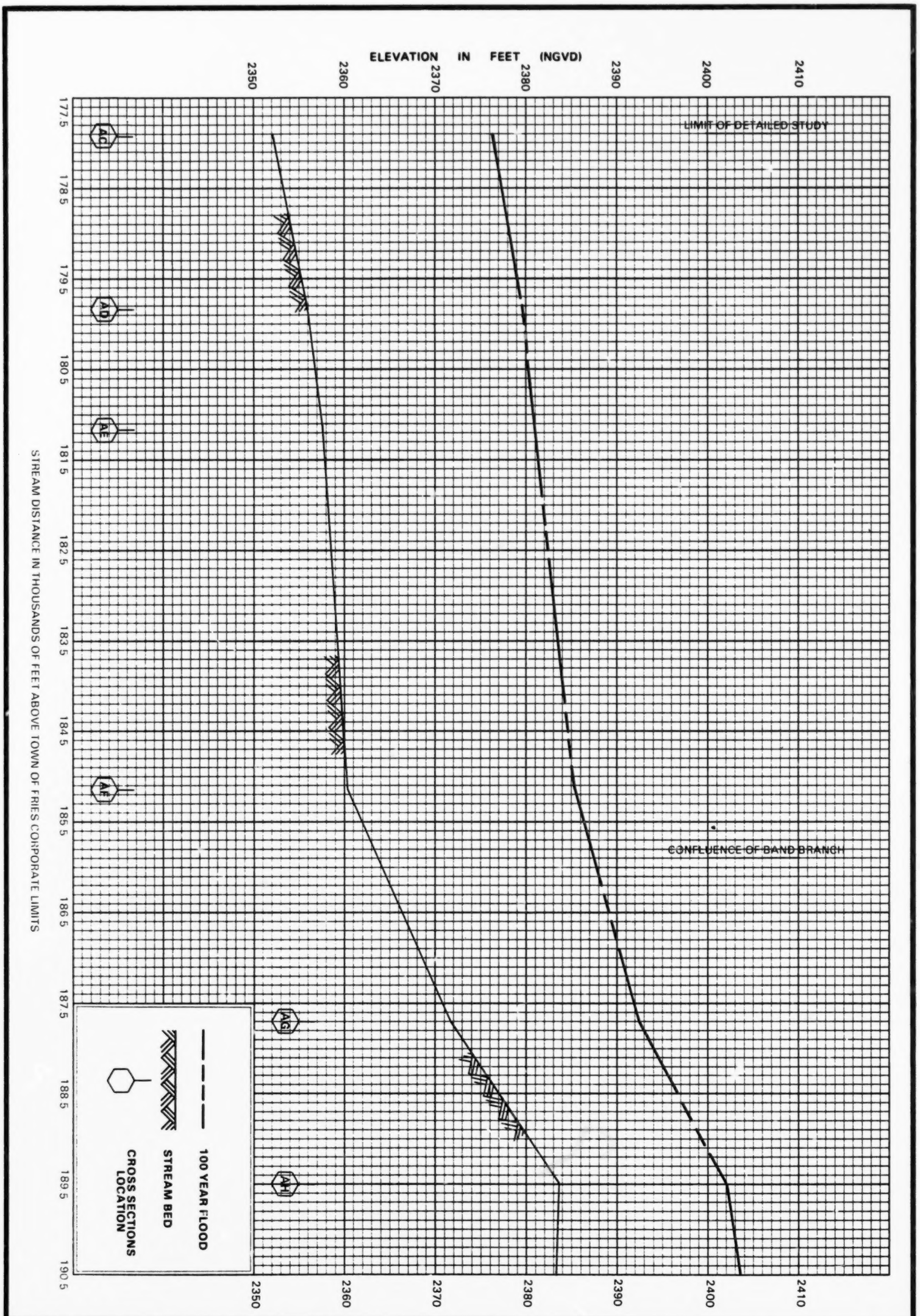
FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

NEW RIVER

08P



09P

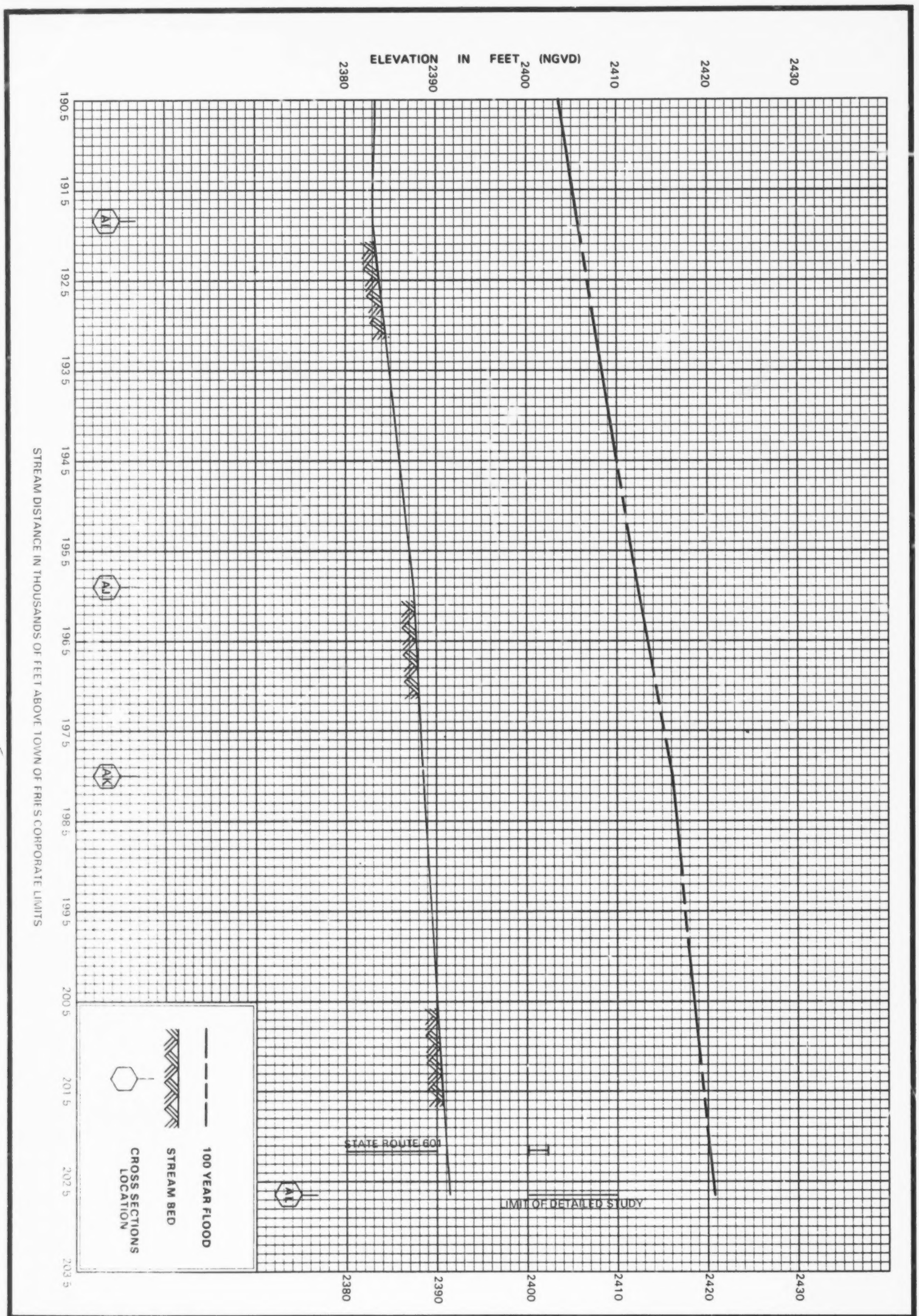
FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

NEW RIVER

27



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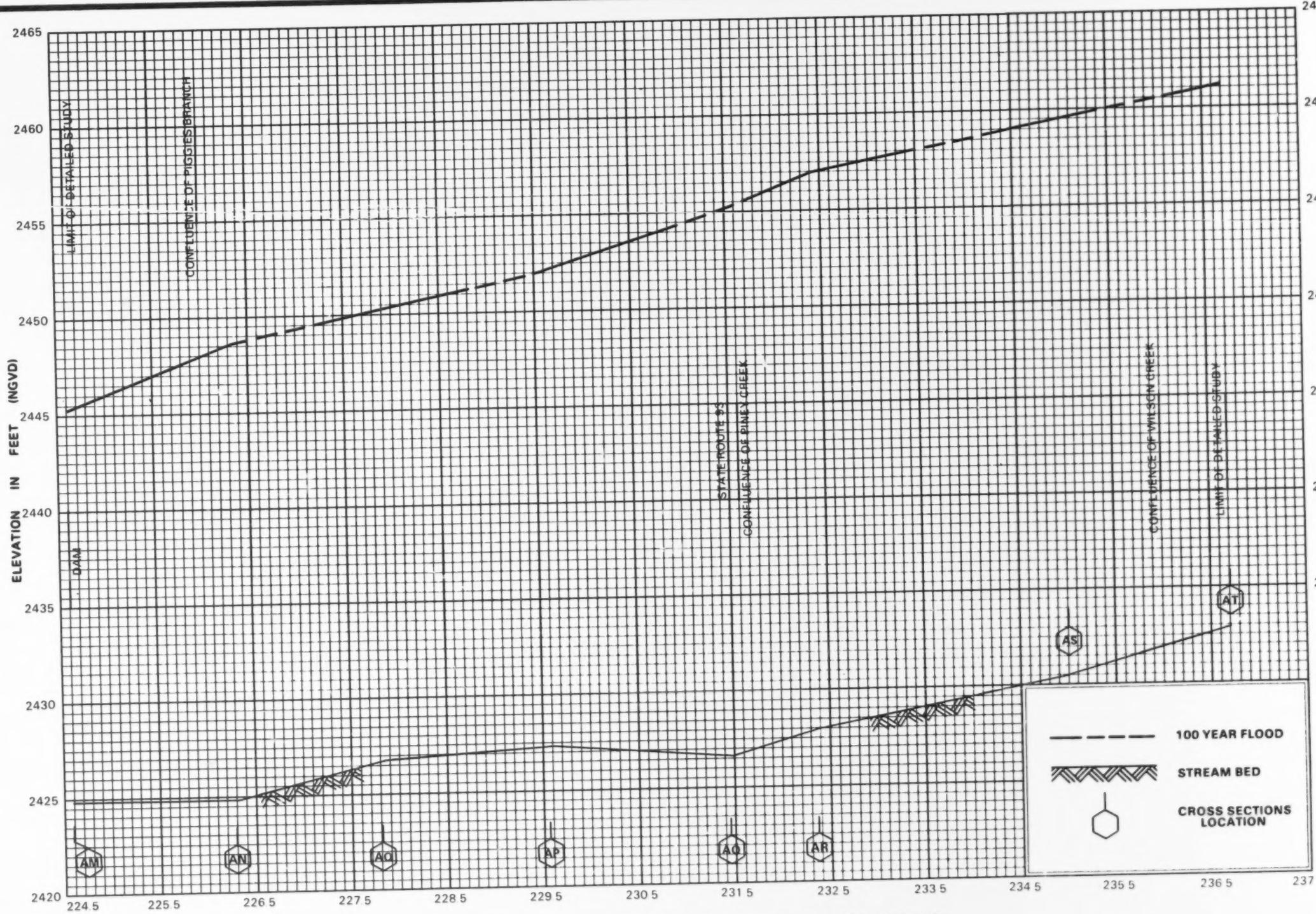


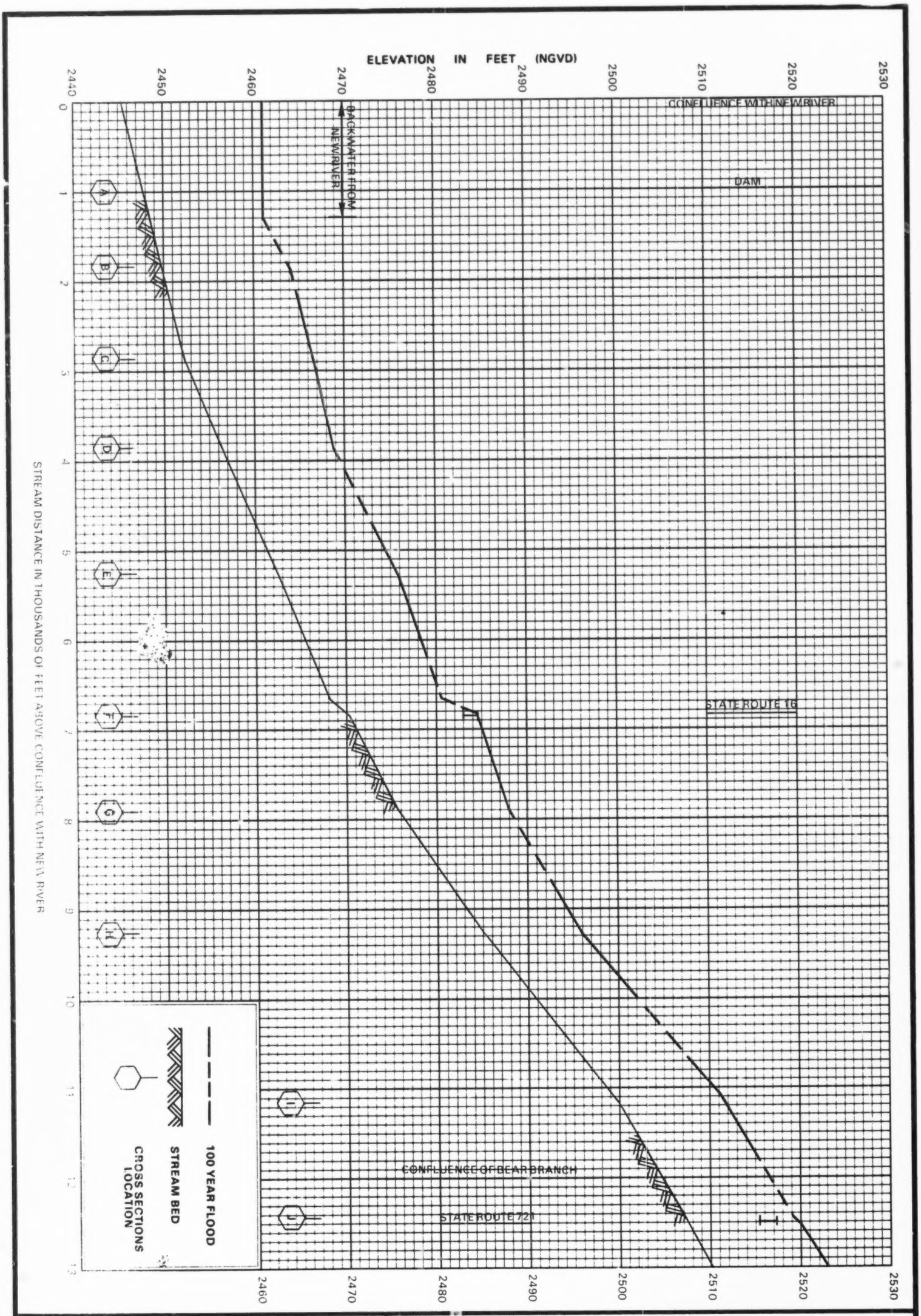
FLOOD PROFILES

NEW RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

11P



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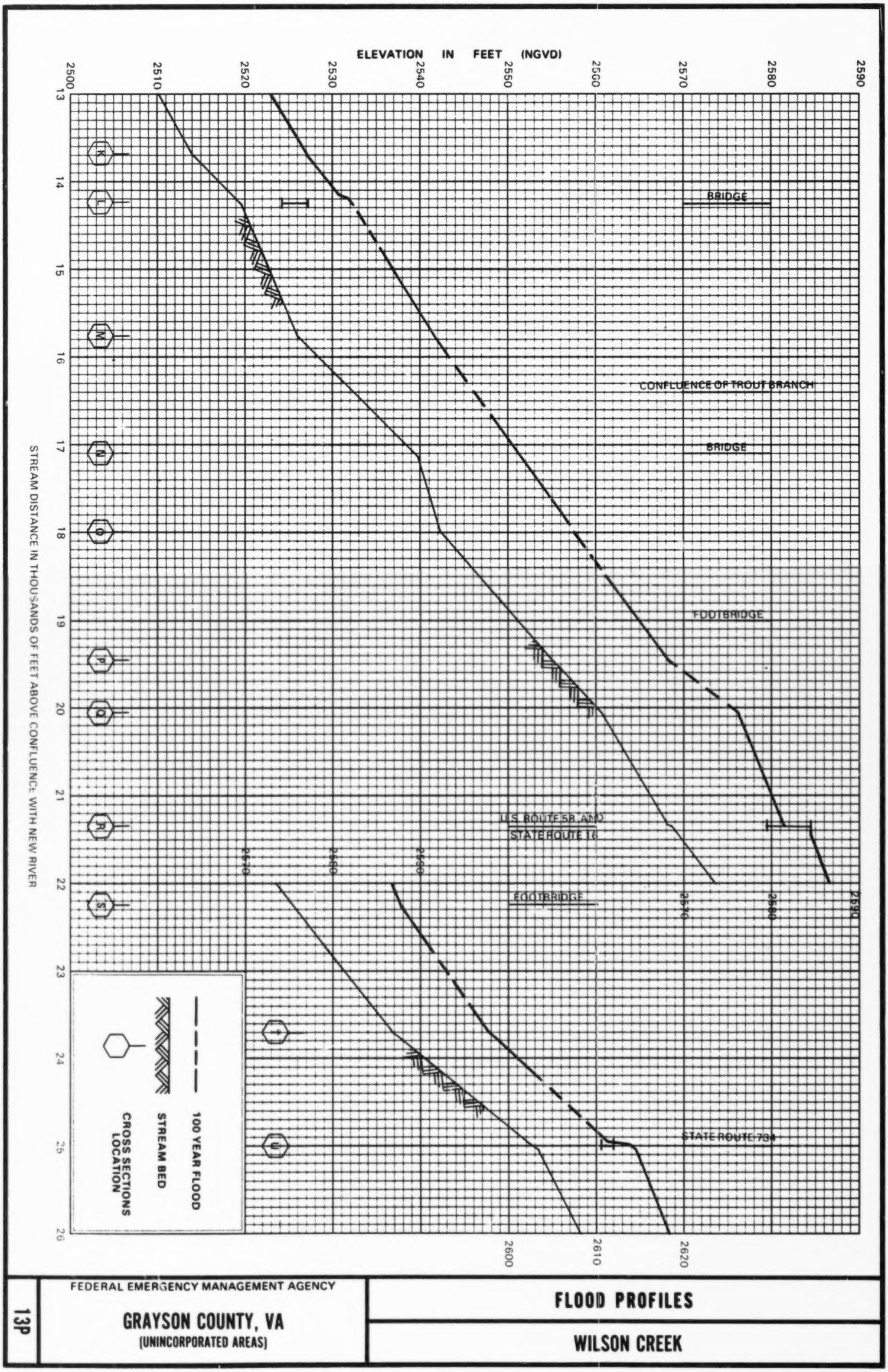


FEDERAL EMERGENCY MANAGEMENT AGENCY

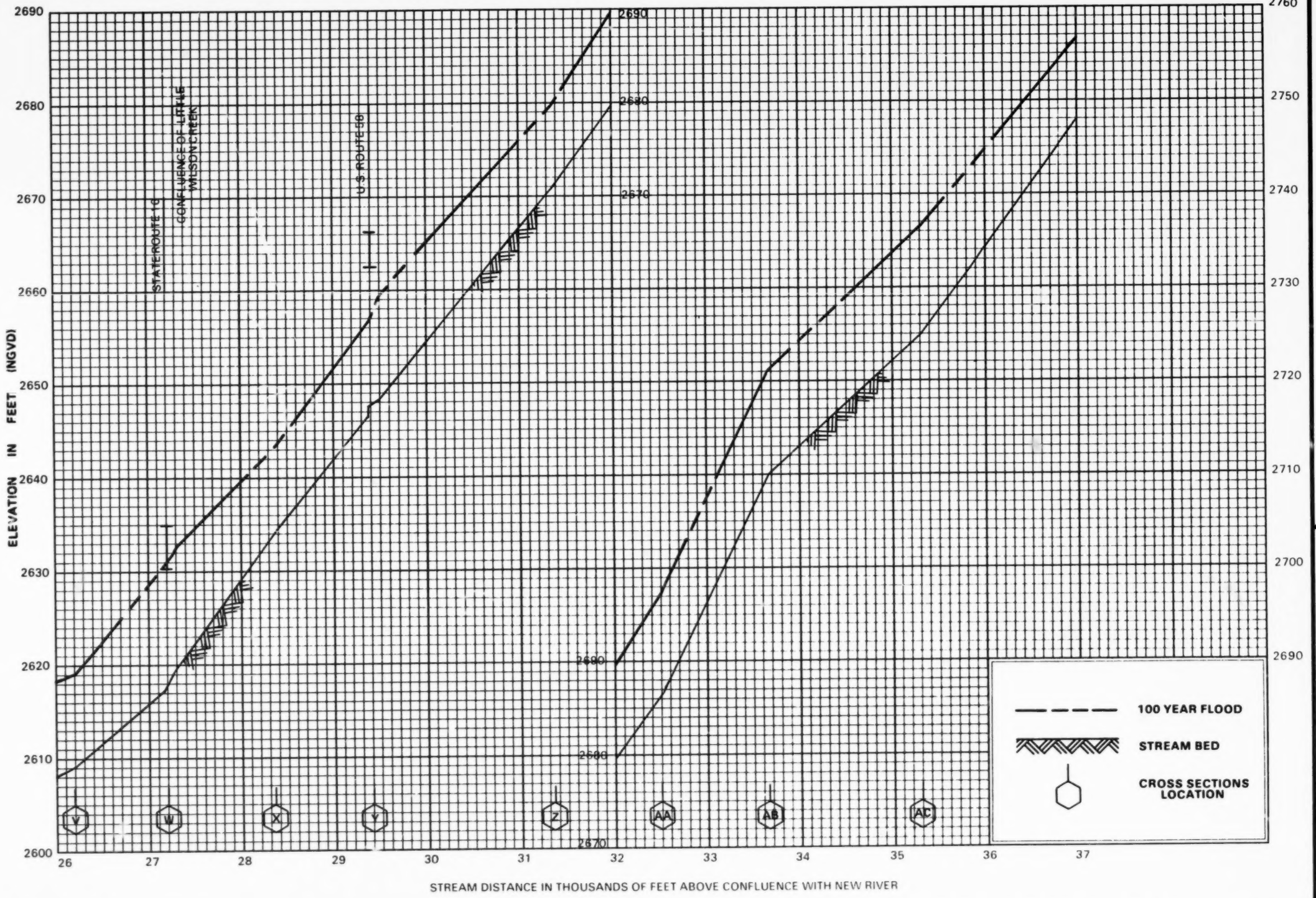
GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

WILSON CREEK

13P

3/



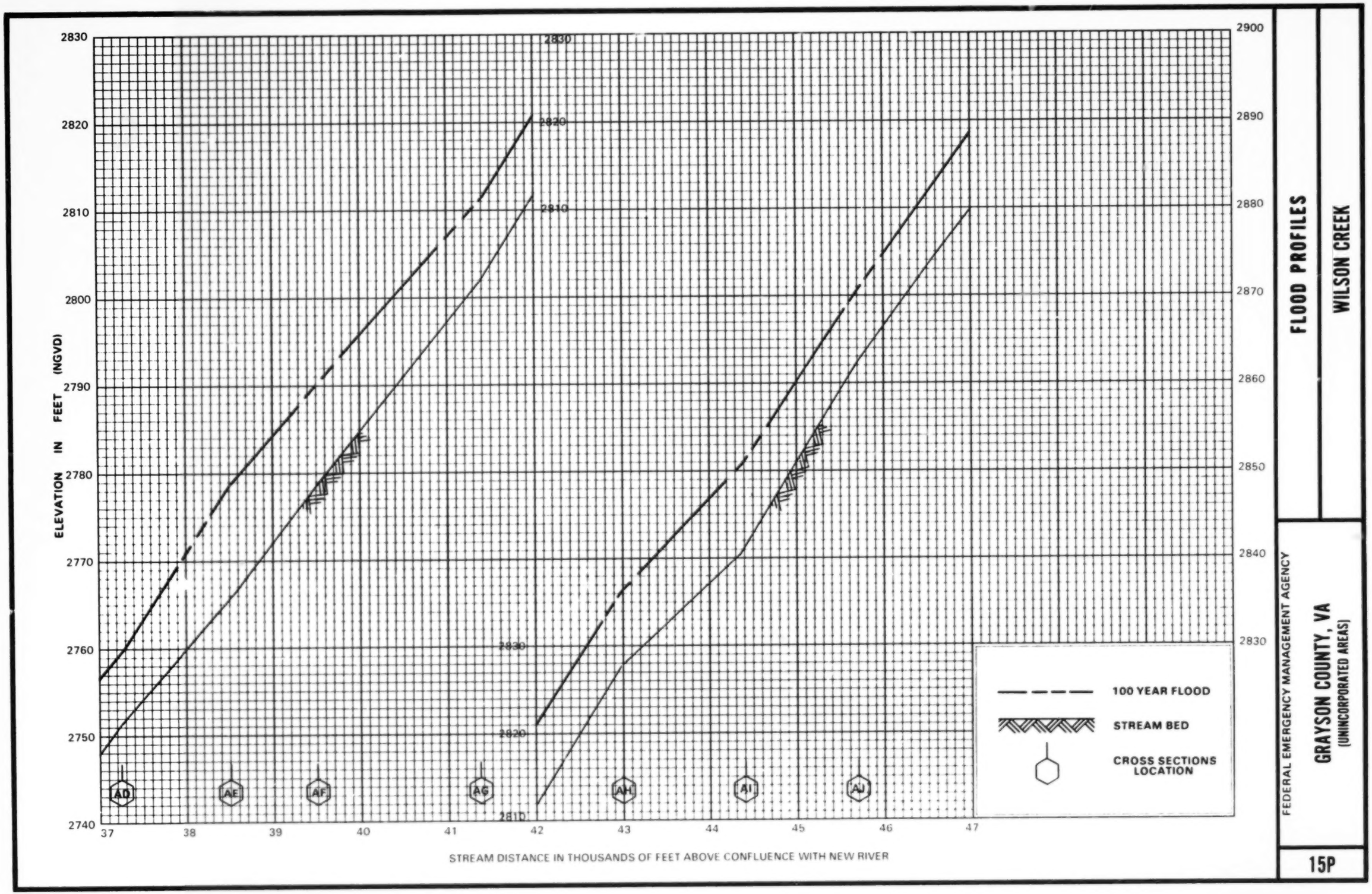
FLOOD PROFILES

WILSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

14P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ELEVATION IN FEET (NGVD)
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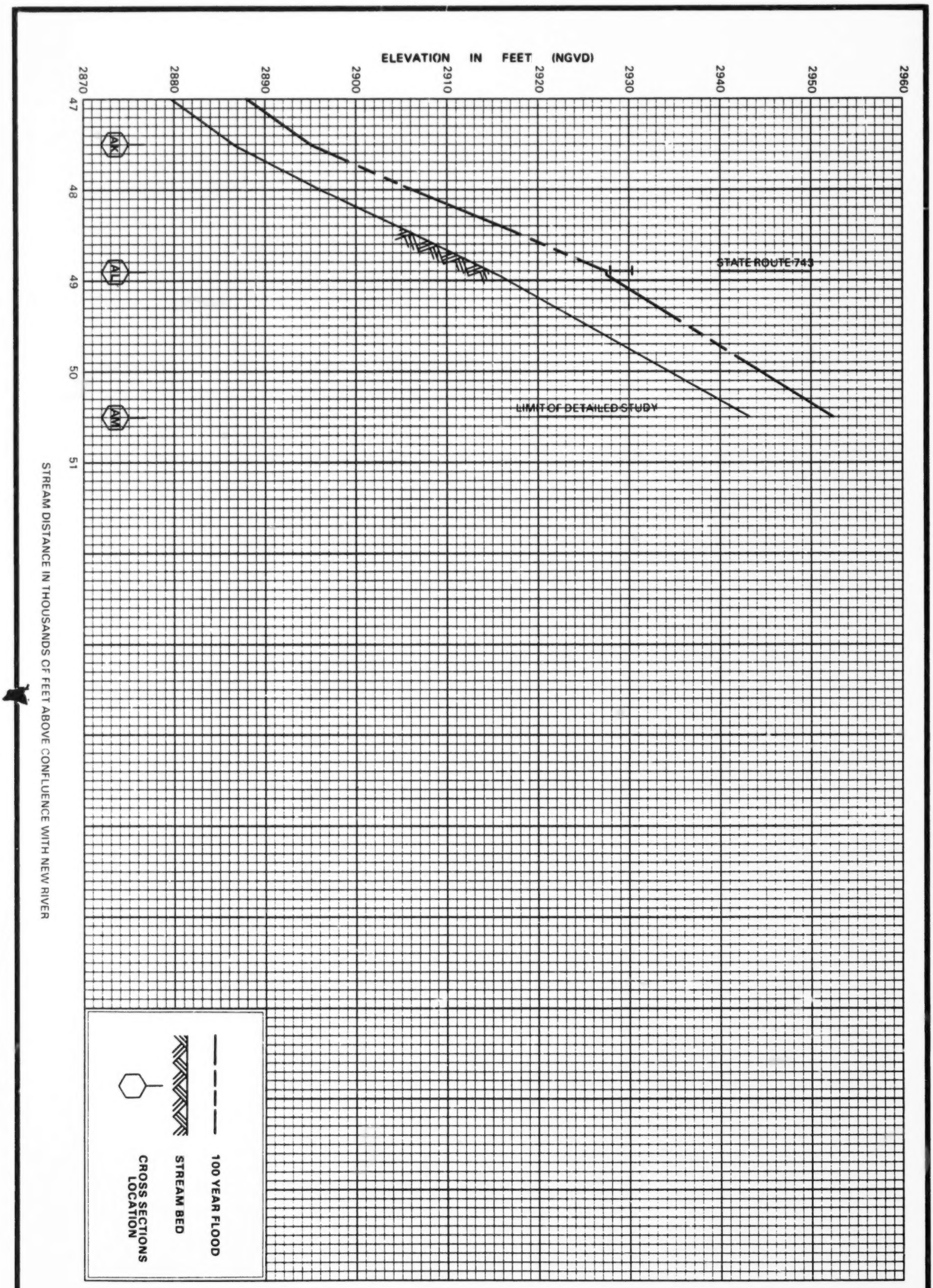
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH NEW RIVER
AD
AE
AF
AG
AH
AI
AJ
100 YEAR FLOOD
STREAM BED
CROSS SECTIONS LOCATION
FLOOD PROFILES
WILSON CREEK
FEDERAL EMERGENCY MANAGEMENT AGENCY
GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)
15P



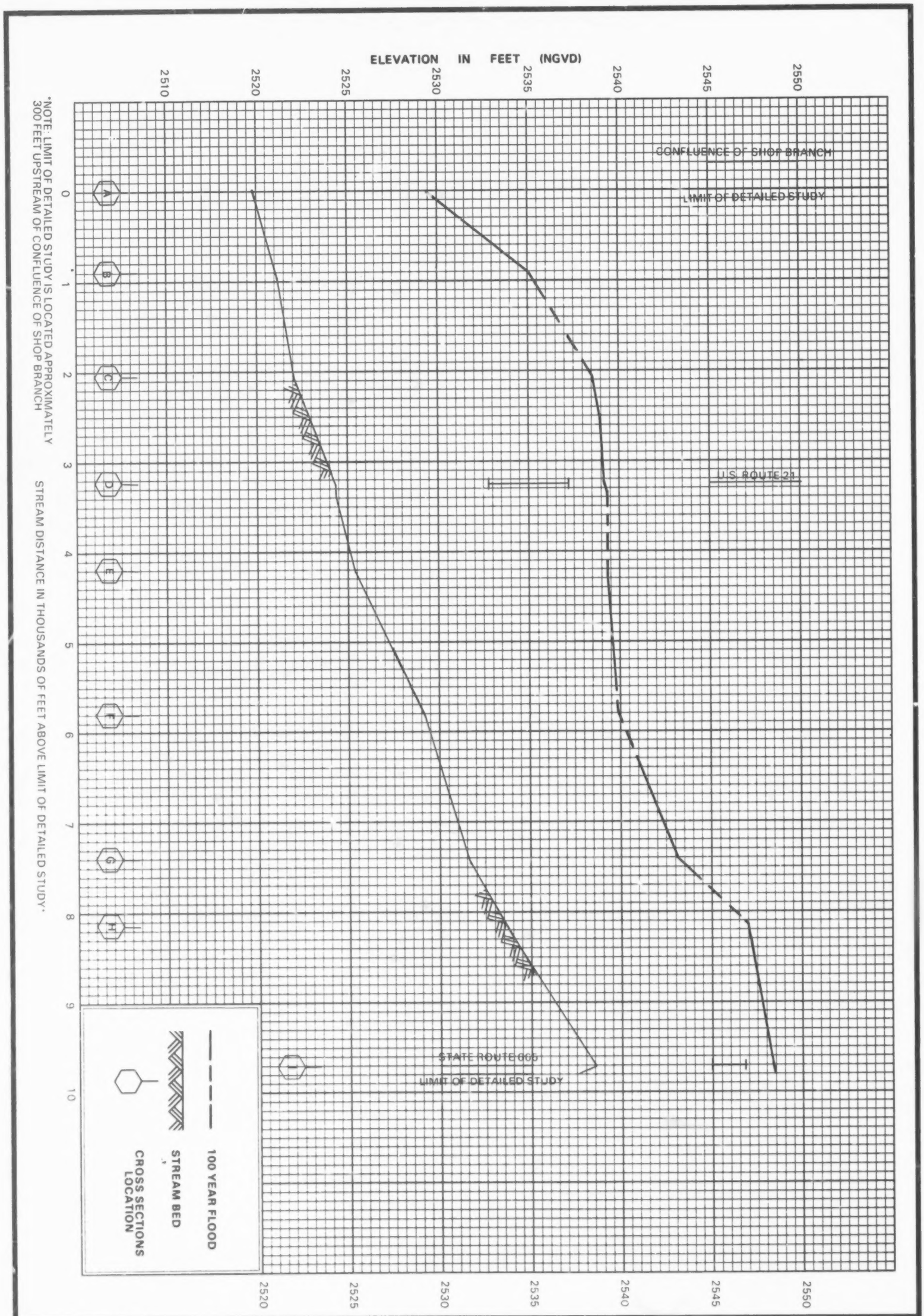
16P

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

WILSON CREEK

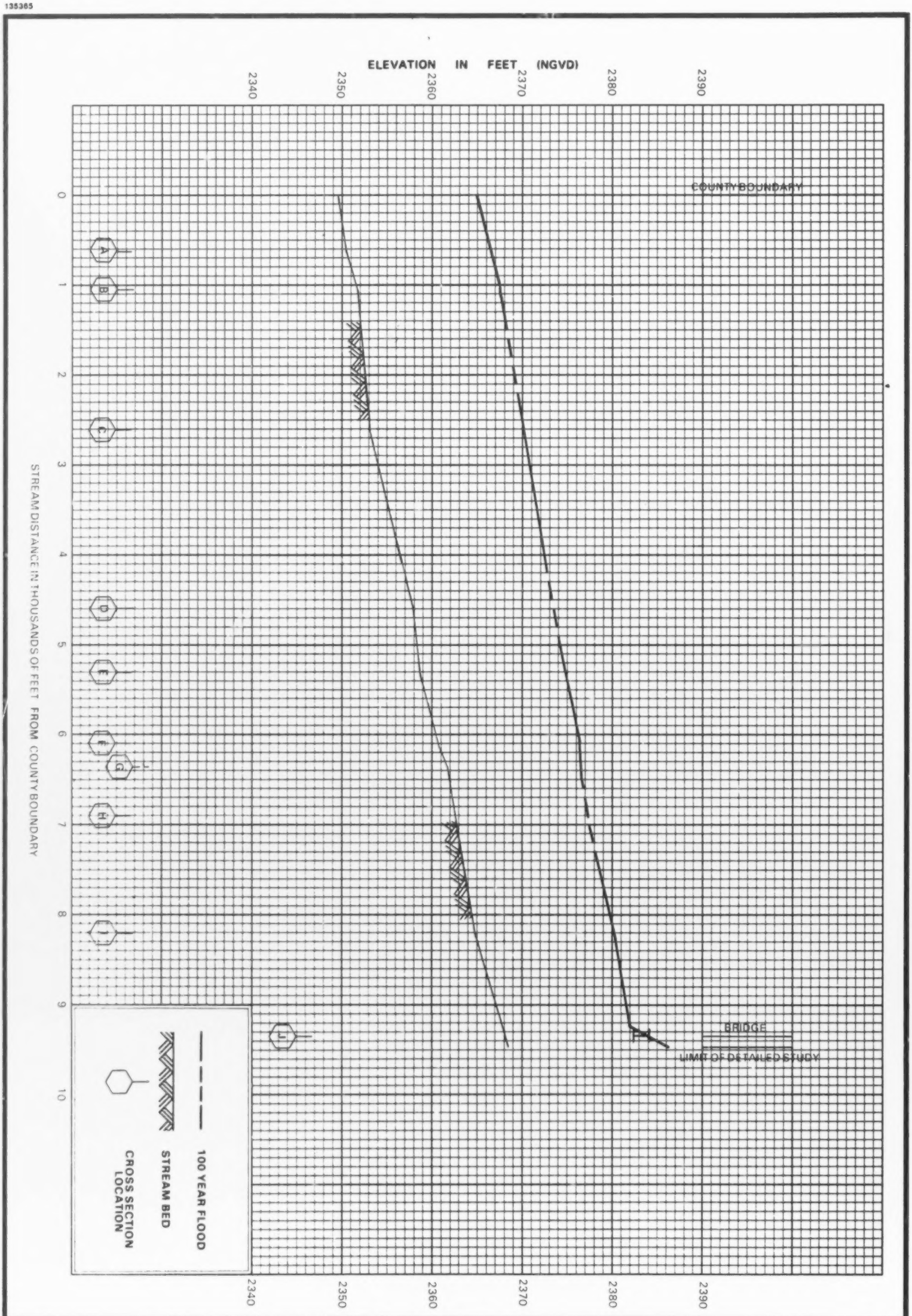


35

17P	FEDERAL EMERGENCY MANAGEMENT AGENCY GRAYSON COUNTY, VA (UNINCORPORATED AREAS)	FLOOD PROFILES ELK CREEK

135365

A & E INC. BALTIMORE



FEDERAL EMERGENCY MANAGEMENT AGENCY

GRAYSON COUNTY, VA
(UNINCORPORATED AREAS)

FLOOD PROFILES

CHESTNUT CREEK

18P